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PHOTOCATALYTIC ACTIVITY OF GRAPHENE OXIDE/ZnO COMPOSITES FOR DYE DEGRADATION

A. O. Rodrigues, R. T. Ferreira, A. V. Pedroso, G. Marciniuk, V. S.Kosera, J. R. Garcia

Department of Chemistry, State University of Ponta Grossa, 1551 Carlos Cavalcanti Av., Uvaranas, Ponta Grossa – PR, 84030-900, Brazil.
E-mail: dre.olirodrigues@gmail.com

Abstract. Incorrect disposal of pigmented effluents from the fabric and pigment manufacturing industry has been a recurring environmental problem. The treatment of these effluents is difficult and requires the use of high cost techniques and materials. In this sense, the development of efficient and affordable processes and materials has attracted great interest.

Among the materials studied for development of process more suitable for the treatment of pigmented effluents, graphene oxide (OG), due to its electronic, mechanical properties and chemical stability, has been shown to be a very versatile material and can act in photocatalysis processes. Zinc oxide (ZnO) has also been used to replace other semiconductors commonly used to perform photodegradation due to its low cost and TiO_2-like properties. Thus, the purpose of this work is to obtain a composite using the two materials mentioned above, which presents a synergistic mechanism for it to work in the field of photocatalysis.

It was produced composites with the following material ratios: *99%*OG/ZnO*1%*, *98%*OG/ZnO*2%*, *95%*OG/ZnO*5%*, *90%*OG/ZnO*10%*, *80%*OG/ZnO*20%*, *5%*OG/ZnO*95%*, *2%*OG/ZnO*98%*, *1%*OG/ZnO*99%* and the behavior of those materials through the photocatalytic degradation of the Reactive Black 5 dye.

The best efficient for the photocatalitic degradation of the Reactive Black 5 dye was shown by the composite *99%*OG/ZnO*1%*using activation of a tungsten lamp. The efficiecy of degradadion was 32%, the same efficiency of the pure ZnO, as esquematiclly demostrated by the Figure 1

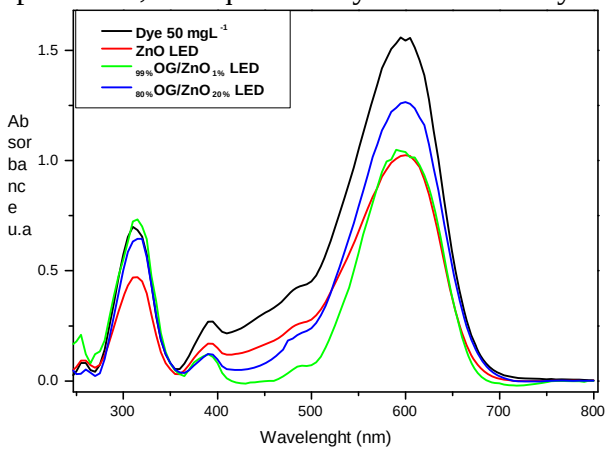

Figure 1. UV-Vis spectra of RB-5 dye after 2h contact with the composites *99%*OG/ZnO*1%*, *98%*OG/ZnO*2%*, and pure ZnO, under W-lamp illumination.

References

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